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BOSTON UNIVERSITY
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Thesis

THE INFLUENCE OF DARWIN ON CERTAIN

DEPARTMENTS OF MODERN THOUGHT.

Submitted by

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(A.B. Ohio Wesleyan, 1926.)

In partial fulfillment of requirements for
the degree of Master of Arts.

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Table of

Contents.

Introduction

History of Evolution Before Darwin 1.
Anaximander 1.
St. Augustine 2.
St. Thomas Aquinas 2.
Special Creation 2-3.
Suarez
Milton
Mutability of Species 4.
Buffon 4.
Erasmus Darwin 4.
Lamarck 5.
Cuvier 5-6.
Lyell 6.
Summary of History of evolution before Darwin 7.

Charles Darwin 8.
Voyage of Beagle 8.
Evidence for evolution 8.
Malthus 9.

Origin of Species. 11.
Revolutionary character 11.
Salient features of Darwin's theory 11-12.
Selection by man 12.
Selection by nature 13.
Difficulties in theory discussed by Darwin 14-15.
Darwin's speculations concerning origins 15-17.

Descent of Man. 18.

Darwin's Contributions to Modern Thought and Science 19.
Natural Selection 19.
Evolution 20-21.
'Science of Origins' 21.
Darwin's personal example 22.

Influence of Darwin With Reference to the
Issue of Positivism versus Metaphysics. 23.
Dewey's view 23-24.
Bergson's metaphysics 24-25.
Morgan's Metaphysics 25.
Relation of Mind to evolution
Mind as creative (Hunt) 26.
Bosanquet's Mind in Evolution 27-28.
Conclusion of discussion 29.

Darwin's Influence in Historical Study. 30.
'Science of Origins.' 30.
Examples of this science 30-32.
Value of this science 32-33.

Darwin's Influence in Ethics. 36.
Ethics as an Historical Science 36-37.
Darwin's Utilitarianism 38.
Nietzsche 39.
Criticism of Evolutionary Ethics 40.
Opposition of Kant's doctrine to Evolutionary Ethics 41.
Evolutionary Ethics overlooks Intrinsic Values 42.

Conclusion of Thesis 43-45.

Page References 46.

Documentation 47-51.

Bibliography 52-53.

THE INFLUENCE OF DARWIN ON CERTAIN DEPARTMENTS OF MODERN THOUGHT.

This thesis aims to consider Darwin's theory of evolution in its relation both to previous thought and to certain ideas in some fields of modern thought. The specific fields in which we shall be concerned to show the influence of Darwin are the fields of positivistic and metaphysical philosophy, history and sociology, and ethical philosophy.

In the fulfillment of our purpose, however, a preliminary step is necessary. We shall begin with a synopsis of the history of the idea of evolution before Darwin. For it is when we view the work of Charles Darwin against its historical background that we are best able to realize its epoch-making importance.

History of Evolution Before Darwin.

Some of the ancient Greeks and earlier Christian theologians were friendly in their thinking to the principle of organic evolution. Three in particular are worthy of mention.

A fantastic and yet interesting suggestion of evolution may be found in the teachings of Anaximander (611-547). This early speculator believed that the earth had once existed in a fluid state and that as a consequence of its gradual drying up the various forms of life which we now know had been produced. Man was the first form to emerge from the aquatic state, his actual emergence having taken place when he burst and threw off the capsule in which his forefather had been encased. Despite

DARWIN'S INFLUENCE ON CERTAIN DEPARTMENTS OF MODERN THOUGHT.

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the grotesque errors of this view we find here evidence of a vague and groping realization of the truth of evolution.

Saint Augustine (354-430), influenced by the Greeks, conceived of creation as gradual, a view not in harmony with a literal interpretation of Genesis. The corporeal form of man, according to his teachings, had gradually developed in a perfectly natural course by reason of powers imparted to it by the Creator.

Saint Thomas Aquinas (1227?-74) although not adding anything substantially new expounded the evolutionary ideas of Augustine at greater length.

Thus by the end of the thirteenth century, beginnings had been made toward a realization of the truth of organic evolution; vague and speculative beginnings perhaps they were, but beginnings nevertheless.

But these beginnings did not develop. In the Middle Ages all interest in the matter seems very largely to have died out. Even in the period immediately following the Renaissance the matter failed to receive attention because of the preoccupation of natural philosophy in the study of structure and physiology.

In the seventeenth century there took place a new movement which was emphatically hostile to evolution. At that time an influential Spanish theologian, Francisco Suarez (1548-1617) took vigorous opposition to the views of Augustine and insisted upon a literal interpretation of the Biblical account of creation as the orthodox teaching of the Church. By an historical coincidence, his work on the continent found support in the writings of John Milton in England; for the story of creation told with epic beauty in the seventh book of Paradise Lost made a profound impression upon

the minds of clergy and laity alike. From Milton's time onward until the middle of the nineteenth century a literal interpretation of the Biblical account of creation was the orthodox teaching of the English Church.

Thus, largely as the result of the writings of a continental theologian and an English poet, there emerged that doctrine of creation by fiat which is known as Special Creation. The content of this doctrine is, of course, of Biblical origin. Inasmuch, however, as it was during the seventeenth century that the advisability of accepting the scriptural account as authoritative was most strongly urged, Special Creation may be regarded as a product of that century.

In the wide acceptance enjoyed by Special Creation lies the principal explanation both to the late development of modern evolution and to the furore of opposition which was to greet Darwin's publication. Osborn says, "If the orthodoxy of Augustine had remained the teaching of the Church, the final establishment of evolution would have come far earlier than it did, certainly during the eighteenth century instead of the nineteenth century, and the bitter controversy over this truth of nature would never have arisen."[1]

But the doctrine of Special Creation was not confined to theology; it had its counterpart in science in the dogma of Immutability of Species. This doctrine extends historically back to Aristotle, but in the seventeenth century it acquired a greater domination over the scientific mind than it had heretofore achieved. For at that time the English biologist, John Ray, performed the service of limiting the term "species", to which no precise definition had heretofore been given, to apply only to individuals derived from similar parents. This was a

contribution of some value, but it lead to unfortunate results in giving new strength to the old belief that species are fixed and unchanging realities.

The doctrine of Immutability of Species offers no explanation of the wide range of variations which occur within species. Hence, upon the closer scrutiny to which the matter was subjected in the eighteenth century, grave doubts about the validity of that doctrine arose. Once again certain men began to think in terms of evolution; but these men, for a variety of reasons, were unable to persuade the world of science at large.

Buffon, the French naturalist (1707-1788) timidly suggested that species had developed gradually and in his Théorie de la Terre laid down the celebrated principle of continuity; to know what has happened in the past and to know what will happen in the future we have only to know what is happening now. Buffon is clearly entitled to a place in the history of evolutionary thinking. He might have been deserving of a very high place had he presented his ideas in a more systematic manner. As the matter stands, however, he seems to have been too prudent to risk his reputation in this way.

Erasmus Darwin (1731-1803) the grandfather of Charles Darwin recognized the wide range of variations which occur within species, and, in his Zoonomia, attempted to explain this fact by a law of sexual selection which he called the "law of battle." It is interesting to note that he vaguely foreshadowed Lamarck's principle of use and disuse of parts.

> "Would it be too bold to imagine that, in the great length of time since the earth began to exist, perhaps millions of ages before the commencement of the history of mankind...that all warm-blooded animals have arisen from one living filament, which the great first Cause endued with animality, with the power of acquiring new parts...and of delivering down these improvements by generation to its posterity, world without end?"[2]

Perhaps it was because of the highly speculative and poetical nature of his writings that Erasmus Darwin did not attract a large following in the world of science.

It was reserved for Lamarck to be the first great systematic exponent of evolution (1744-1829). Recognizing the fact of variations within species he attempted to explain the matter by a proposition which he called "the law of Use and Disuse of Parts." According to this "law" the efficiency of any part of the body depends upon the amount of exercise which it receives, the amount of exercise being determined in turn by the nature of the environment. Variations thus acquired are transmitted to the next generation, and thus the various parts of the body become increasingly strong or weak through successive generations. The length of the giraffe's neck he explained as resulting from a gradual increase from one generation to the next. It is interesting to note that in an age when the true antiquity of the earth was not realized, Lamarck insisted that a very long time was required for the formation of a new species. He further maintained that an organism will acquire a new organ when it has physiological need of it, and that this organ will be transmitted to the next generation.

Thus Lamarck became the first emphatic exponent of the inheritance of Acquired Characters, a theory which, although supported by many modern experimenters (Neo-Lamarckians) is not regarded as thoroughly proven by modern biology at large.

In spite of the fact that some aspects of his theory are debatable, it is certain that Lamarck, insofar as he expounded evolution, gave a more satisfactory explanation of the origin of species than anything heretofore advanced. But he was a prophet without honor in his own times. For his doctrine met with the vigorous opposition of Cuvier, the dictator in science of the eighteenth century, who found this new evolutionary doctrine antagonistic to his own doctrine of Catastrophism. By reason of his greater

prestige, Cuvier triumphed over Lamarck, and the first systematic exponent of evolution died discredited.

The Catastrophism of Cuvier constituted a singularly formidable obstacle to evolution. This doctrine is an attempt to explain geological phenomena in terms of a series of destructive upheavals in the past. Various cycles of life were believed to have developed in the past only to be annihilated by some cataclysm, whereupon another cycle of life would develop and likewise meet with destruction. The Noachian flood was looked upon as one of the "catastrophes" in question. So long as Catastrophism dominated scientific thought any hypothesis suggesting the principle of long and gradual development of species would be manifestly impossible. Catastrophism must be overthrown before evolution could advance.

In 1830-1833, at the very height of Cuvier's prestige, Catastrophism itself met with the unhappiest "catastrophe" of all. For there was then published in England a work of three volumes entitled The Principles of Geology which was destined in very short order to bring about the complete overthrow of Catastrophism. In this work the author, Charles Lyell, emphasized the principle which had already been laid down by Buffon and an earlier geologist, Hutton, that we are to interpret the past in the light of what is now going on. The long continued and uniform action of rains and frost, rivers and oceans, earthquakes and volcanoes is sufficient to account for the present form of the earth's crust. For Catastrophism, then, Lyell substituted the doctrine of Uniformitarianism, upon which modern geology is built. With the discrediting of Catastrophism the way to the full acceptance of evolution was cleared of one obstacle. There still remained Special Creation.

Our mention of the work of Lyell brings us close to the Darwinian epoch, for the first editions of Lyell's Principles and Darwin's Origin of Species were separated only by a period of twenty-nine years. We are now ready to summarize our brief history of evolution prior to Darwin.

It is clear, in the first place, that in offering the principle of organic evolution to the scientific world in 1859 Charles Darwin cannot be said to have been offering something entirely new. However much his predecessors may have differed in their methods and results, it is clear that there were a considerable number of pre-Darwinian evolutionists.

It should be recognized, in the second place, that these earlier evolutionists had made a valuable scientific contribution in pointing out the fact of mutability of species. When Darwin came to construct his own theory he had the principle of variations to build upon. We shall see that he started by assuming variations, whereas Lamarck, one of the most important of his predecessors, had already gone more deeply into the matter by attempting an explanation of variations in terms of use and disuse of parts. For the fact of variations within species, then, Darwin was indebted to earlier workers.

As a third fact, however, it must be recognized that the earlier exponents of evolution, however valuable their suggestions may have been, had failed to win any wide and permanent recognition of the truth of evolution from the world of science at large. Lamarck had failed because of the powerful personal opposition of Cuvier. The other pre-Darwinian evolutionists had failed because of the highly speculative nature of their views. Special Creation dominated theological thought down to 1859; and to a smaller extent, and despite its having been repeatedly discredited by the earlier evolutionists, the doctrine of Immutability of Species still

persisted in biology.

It is this third fact which enables us to see the epoch-making importance of the work of Charles Darwin.

Born in 1809 Charles Darwin was twenty-two years old when he received appointment as naturalist on the ship Beagle which was about to embark on a voyage around the world for the purpose of surveying the coast lines of South America.

Although already a promising young naturalist, Darwin left England without any theory in his mind. When the ship returned to England in 1836 his logical mind felt the need of some theory and was groping its way toward one, but it was not yet formulated.

What, specifically, were the facts observed by Darwin which had bearing on the theory which he was later to bring forth?

He had already read an advance copy of the first volume of Lyell's Principles and was a loyal disciple of Lyell's geology. In South America he came upon evidence which confirmed him in his belief in an immeasurable span of past geological time: here he discovered marine fossils at a height of 14,000 feet above sea level. Could it be possible that these had been raised to such an altitude merely by the action of uniform forces? Well might his confidence in Lyell's geology have been shaken but for a certain subsequent event. While the Beagle was located off the coast of Chili an earthquake occurred. Returning, after the quake, to land for the purpose of making a survey, Captain Fitzroy of the Darwinian party found putrid beds of mussel shells adhering to the rocks ten feet above sea level. Darwin was deeply interested in his report. Elevation of land, then, may indeed be explained by the action of uniform processes. But, if one quake results merely in an elevation of a few feet

an enormous span of time must clearly be allowed for the formation of a range of mountains twenty thousand feet in height; especially must this truth be felt when it is borne in mind that subsidence sometimes alternates with elevation.

Furthermore Darwin beheld something of the warfare between nature and life. On one occasion he counted the carcasses of twenty deer which had been killed by a single hailstorm. As the Beagle was leaving Plata he saw tens of thousands of butterflies swept into the ocean by a strong breeze. In Chili he came upon the ravages of hydrophobia. While in Australia he observed that Europeans in a perfect condition of health transmitted disease to the weaker native races.

He also beheld primitive man in his natural environment, a spectacle which made a profound impression on his mind. At Wollaston Islands he saw savages without clothes or shelter huddle beneath a storm of sleet; he learned that they subsisted on berries and whale's blubber and that, when provisions were lacking, they slew and devoured their old women. Could it be that our progenitors had been men like these?

In 1836 he read Malthus' Essay on <u>The Principles of Population.</u> The thesis of this work is that means of subsistence increase only in arithmetic ratio, while life increases in geometric ratio. An intense struggle for existence must clearly be the result of this condition. What is that law of nature by which the stronger seem always to be engaged in exterminating the weaker?

It is impossible to consider the life and work of Charles Darwin without thinking of him as a man of genius; for certainly he possessed in very marked degree that kind of genius which is the capacity for taking

infinite pains. For twenty years, although virtually an invalid, he devoted himself to the arduous task of conceiving and setting forth in convincing manner a theory which should account for the facts which had made such a deep impression upon his own mind. Out of these labors emerged The Origin of Species.

The Origin of Species

Because of the difficulty in distinguishing between genuine species and mere varieties, a completely satisfactory definition of species is impossible. "Yet," as Darwin says, "every naturalist knows vaguely what he means when he speaks of a species. Generally the term includes the unknown element of a distinct act of creation."[3]

The words "unknown element" should be made emphatic for they throw light on the revolutionary character of Darwin's theory. Science may learn much about the order of natural events up to that point where the act of creation is involved, but further than this it cannot hope to go; such was the theme of the prevailing pre-Darwinian philosophy. But the Darwinian hypothesis is directly opposed to any such view. In presenting his own theory the great naturalist of course wisely avoids the use of the term creation. Nevertheless the fundamental assumption of Darwinism is that even in the development of living forms there are certain orderly principles upon which the mind can lay hold; that, by grasping these principles the "unknown element" can be very greatly reduced.

The salient features of the Darwinian theory of Origin of Species may be summarized as follows:

1. Nature is an organic whole composed of closely interrelated parts; the structure of every living being is related, although often in hidden manner, to that of every other living being with which it comes into competition in the struggle for existence.

2. Variations occur within species. The high rate of fecundity which characterizes all living organisms results in an intense struggle for survival.

3. Any favorable variation, however small, will favor a given

species in this struggle.

4. These slight variations, accumulating over a long period of time are sufficient to account for the formation of new species. Variations are "incipient species."

Darwin opens The Origin of Species by calling attention to the fact (by no means new with him) that variations occur within species. Concerning variations he makes the following suggestions; that changes in embryo or larva produce "correlated variations" in the mature animal; that, as previously maintained by Lamarck, the use and disuse of parts have an effect upon their size and strength; that, however, in the production of variations, the nature of the organism is a more important factor than the nature of the environment, thus reversing the theory of Lamarck; and that changed environmental conditions produce variations in the organism by acting directly on the organism and indirectly upon the reproductive system.

But he is not interested chiefly in how organic variations originate for this matter he confessed he cannot explain. Taking variations for granted he is primarily interested in what effect these variations, accumulating over a long period of time will have on the development of any given species.

Does man know anything about heredity as a practical matter? Certainly, for breeders have come to regard an animal's organization as something plastic which they can model and change almost as they please. The dray horse, the race horse, the game cock, the many breeds of dogs and sheep are examples of man's power to select and preserve those variations which are most useful to him.

In the state of nature, too, variations, although less marked

in degree, do most certainly occur. Consider the numerous breeds of pigeons--the tumbler, the carrier, the barb with its short beak, the runt with its long beak, the pouter with its great crop, the turbit with its reversed breast-feathers, the fantail, the laugher and the trumpeter. Yet all these breeds are descended from one species, the rock pigeon. How has this come about?

We have said that man has the power of selecting and preserving those variations which are useful to him. May we not assume that Nature herself, in a somewhat similar manner, selects and preserves those variations which are best, in this case not for the selective agent, but for the species herself! If so, may we not go one step further to assume that varieties are incipient species the development of which is governed by Natural Selection!

"I look at individual differences, though of small interest to the systematist, as of highest importance for us, as being the first steps toward such slight varieties as are barely thought worth recording in the works of natural history. And I look at varieties which are in any degree more distinct and permanent, as steps toward more strongly marked and permanent varieties, and at the latter, as leading to sub-species, and then to species. The passage from one stage of difference to another may, in many cases, be the simple result of the nature of the organism and of the different physical conditions to which it has long been exposed; but with respect to the more important and adaptive characters, the passage from one stage of difference to another may be safely attributed to the cumulative action of natural selection.....A well-marked variety may therefore be called an incipient species..."[4]

Natural Selection is the distinctive feature of Darwin's theory. We may best know what Natural Selection is by knowing how it operates. Let us think of a country the climate of which is undergoing change. Because of the unity of all nature the number of inhabitants will likewise change and some species will become extinct. In this situation any variation however slight which favored the individuals of one species by better adapting them to the changed conditions of environment would tend to be preserved and perpetuated.

Natural Selection, then, operates by adding up those slight variations which are useful to a given species, and it is this process, and

this process alone, which gives rise to those important structural variations which so nicely conform to the habits of any species. The possession of small beneficial variations will aid in the struggle for existence, and throughout a long period of time that species which has accumulated a large number of slight beneficial variations will have emerged to higher form.

With characteristic candor, however, Darwin concedes that there are difficulties in such a theory and these he proceeds to discuss at considerable length. Two of the more formidable of these difficulties are as follows: first, if it be true that all species have descended from other species (or from a common progenitor) by close graduations, why do we not find in nature a great number of transitional forms? Secondly, is it possible to believe that Natural Selection can produce two species differing so widely in structure and habit as do, for example, the giraffe and the bat?

In discussing the first of these questions Darwin calls attention to the immeasurable span of geological time required for species to have assumed their present form. The operations of Natural Selection are very slow and many of the transitional links have been lost to view. No soft organism can be preserved: our geological record is therefore paltry and imperfect. Darwin, then, regards the absence of transitional links as being in itself a conclusive argument neither for nor against the truth of Natural Selection. It might parenthetically be remarked at this point that the geological record is now more perfectly known than in Darwin's day, with the result that paleontology furnishes one of our chief sources of positive evidence for the truth of evolution.

To the question concerning the adequacy of Natural Selection to produce two totally different organic structures Darwin gives an emphatic answer in the affirmative. The survival of a species depends upon its fitness for its particular environment. But environments differ: hence species

differ. Consider the variations existing within the family of squirrels; those varieties which are accustomed to fly or leap are equipped with large tails and an expanse of skin between limbs and body to facilitate flight and reduce the danger of falling. Whatever the complexity of an organism, however great the range of variations, Darwin sees Natural Selection as the all-important factor in evolutionary development of species.

Darwin is quite willing to concede that the case for evolution is not (or was not in his day) complete because of the lack of transitional forms. Nevertheless he emphatically maintains that it is the anti-evolutionary doctrine of Special Creation rather than his own theory of evolution which is beset with the greatest difficulties. "He who believes that each being has been created must occasionally have felt surprise when he has met with an animal having habits and structures not in agreement."[6] An example of this disagreement is furnished by the duck and goose which, although eminently creatures of the soil, have feet which are webbed for swimming. Community of descent in the view of Darwin and of modern biology is the only principle capable of explaining the homologous or structural similarities obtaining among the higher vertebrates.

Having sketched the theory of Darwin up to this point, we must now consider his speculations concerning the original birthplace of species. He believes it to be most probable that all species originated in one area and that the various species subsequently migrated, in many cases to great distances, from that original area. Great Britain possesses the same quadrupeds as are found in continental Europe, a fact which indicates that the two areas were once united. But many of the species of Europe and Australia respectively are different because these areas have not been united.

Conclusively to prove the existence of a single birthplace for all species is a difficult task because of the fact that areas now continuous must once have been discontinuous and vice versa. We have, however, every reason to believe that many seemingly insuperable geological barriers have been overcome because birds have carried seeds from one area to another in their crops, in their intestines, or in the dirt adhering to their feet. When we bear in mind the important part played by these aerial agents of dispersal, the most serious objection to the theory of a single cradle for all species is overcome.

We may, then, according to Darwin assume that all life traces back to one birth place. But what has happened in the long period extending from the time of the origin of life to the present? To this what facts, or probable facts, do we have concerning the actual process of evolution? To this question Darwin gives the following answers.

New species have arisen by the slow accumulation of variations favorable to them. Those species which were poorly equipped for the struggle for existence were forced to drop out and have never reappeared.

Species belonging to different genera have changed at different rates and to different degrees. In the tertiary beds (by "tertiary" is meant the geological epoch which immediately preceded the establishment of the present geological order) a few shells of organisms now living are found with a multitude of extinct forms. Although there are exceptions to the rule, it is probably true that those organisms which are high in the scale have changed more rapidly than those which are lower; this fact may be due to their more complex relationship to their environmental conditions.

In members of the same class, however, the average amount of change during long and equal periods of time, is probably nearly equal. Some degree of regularity obtains here because all the species of the same group have descended from a common progenitor.

The general rule of evolution is probably this; that groups have increased in number until the maximum is reached, after which the number proceeds to fall off. We should not marvel at the fact that certain species have become extinct. In order to explain the extinction of some species and the progressive evolution of others we must bear in mind two facts; on the one hand, there is the fact that all species tend to increase at a tremendous rate, and on the other hand there is the fact that such natural checks as disease, warfare, and the rigors of climate, although they are seldom actually perceived by us, are constantly at work eliminating the weaker individuals and the weaker species.

When we consider these two facts we must, according to Darwin, recognize the important part which Natural Selection has to play in evolution.

The Descent of Man.

In his latter work, The Descent of Man, Darwin sets forth the various facts which give evidence of man's having arisen from a lowly origin in accordance with the principle of Natural Selection.

Briefly stated the facts are as follows;

Man's bodily structure is of the same general plan as that of the other mammals; his brain, bones, muscles, nerves and internal viscera all correspond to those of the monkey, bat, or seal. Man may receive from, or communicate to, the lower animals such diseases as hydrophobia, variola, and cholera. In his embryonic growth, the development of man's hands and feet follows the same fundamental plan which underlies the ~~rise~~ development of the feet of lizards and the wings and feet of birds. Furthermore, man's body bears certain rudiments of organs, which, although possibly useful at some former time, are now useless. Examples of these rudiments are found in the muscles of the scalp, the nictitating membrane or third eyelid (called, in man, the semilunar fold;) the posterior molar teeth; and the rudimentary mammae in males.

Darwin then proceeds to apply his theory of Natural Selection to the rise and development of man's moral nature and mind. In later topics, namely Darwin's influence with reference to the issue of Positivism Versus Metaphysics, and Darwin's influence in Ethics, we shall deal with this aspect of Darwin's theory.

Darwin's Contributions to Modern Thought.

We have outlined the theory of Darwin. We must now ask, "What, specifically, are his contributions to modern thought?" We shall first mention his contributions of content.

The most obvious of these is Darwin's own particular theory of evolution, namely Natural Selection. Strictly speaking, we cannot say that this theory originated with the great biologist of the last century, for Darwin himself accredits Aristotle and others with having vaguely anticipated Natural Selection. Nevertheless it is to Darwin that we are indebted for our clearest and most emphatic exposition of Natural Selection.

But is Natural Selection a truly adequate explanation of evolution? A majority of modern biologists have definitely rejected the Darwinian theory as the final explanation of evolution. The Dutch biologist, Hugo DeVries, has demonstrated that radical and qualitative changes sometimes occur within the development of species and his experiments have resulted in the discrediting of the Darwinian theory as a completely satisfactory explanation of the origin of species; for Natural Selection acts only by adding up slight variations.

Coulter gives a concise and non-technical statement of the defects of Natural Selection:

"When we subject Darwin's theory of Natural Selection to a critical analysis in the light of our modern knowledge of heredity, we are forced to conclude that in one way Darwin was right and in another way he was wrong. In a very general sense, natural selection is the true and final explanation of progressive evolution; but if Darwin attempts to account for all evolution through natural selection among small quantitative variations, his theory is erroneous. Today we understand a great deal more exactly than Darwin ever did just what these small quantitative variations

amount to. We must recognize that selection may be successful in accumulating the effects of these variations, and we understand rather exactly how this result is attained. But we can also see plainly that such selection must always reach a limit beyond which further progress by the same means is clearly impossible, and we know that in every case in which selection has been tried this impassable limit is actually reached. To pass this critical limit requires that something new be introduced by mutation. We finally fall back, therefore, upon the mutation theory."[6]

Natural Selection is, then, partially right and partially wrong. The possession of slight beneficial variations may favor certain species in the struggle for existence. When we attempt, as did Darwin, to account for the origin of species merely in terms of Natural Selection, we are going too far in our enthusiasm. Natural Selection may give rise to small quantitative changes, but it cannot give rise to radical, qualitative changes.

Darwin's second contribution of content resides in the fact that it was he who established the principle of evolution on a firm, scientific basis. With the publication of the Origin of Species evolution was taken from the realm of speculation into the realm of concrete fact. Darwin's clear and persuasive exposition of his particular theory, and the wealth of definite factual evidence presented by him in support of his views are factors which could not have failed to win the respect of science, and to focus the attention of the scientific and even of the lay world upon the truth of evolution. In our own day evolution is a fact, inductively and deductively established. Whatever may be the defects of Natural Selection as the final explanation of evolution, the historical fact remains that it was through the theory of Natural Selection that the final establishment of evolution was brought about.

Darwin has likewise made a contribution of method, for it was he who introduced and established "the science of origins." It is true that

that he confined himself to speculations concerning the origin of organic beings. Nevertheless the science of origins has been extended into the fields of politics, sociology, ethics and religion. If we wish fully to understand any unit whether it be a biological organism, or a social institution, we must trace it to its historical origin.

Darwin's fourth contribution resides in the fact that his career furnishes one of history's highest examples of scientific constructiveness. Five hundred years ago the Elizabethan philosopher, Francis Bacon, proposed a new method for the advancement of science, and of the constructive possibilities of his method the career of Darwin furnishes an illustrious example.

If we are to contribute anything to the advancement of science, said Bacon, we must approach our problems with minds free from old theories, opinions and notions; we must accumulate, partly from natural history, partly and principally from experiments, a store of particulars sufficient for our purposes; we must so tabulate and arrange this store that the intellect may be able to act upon it; we must, from these tabulated particulars, ascend to general comprehensions; we must however avoid the natural, but dangerous temptation to formulate those highest generalizations which may be called principles.

Consider the career of Darwin in the light of these suggestions. The voyage of the Beagle brought the young naturalist into contact with a vast store of particulars; and to the arrangement and classification of his specimens Darwin devoted a considerable portion of his time during a period of five years. But it was in the deeper significance,

rather than in the mere cataloguing of his specimens that he was primarily interested: his intellect playing upon his vast store of particulars demanded some generalization which should explain his facts. Then, too, Darwin was an experimenter; consider the painstaking care with which he counted his seeds while experimenting on variations in plants. If any single career can furnish a perfect example of the constructive possibilities of Bacon's method, certainly the career of Darwin does that very thing.

The Influence of Darwinism with Reference to the Issue of Positivism versus Metaphysics.

Scientific advance is to be achieved through the mastery of a wide range of concrete facts rather than through the medium of metaphysical speculation. This is not a new truth, but it is certainly one which has impressed itself anew upon the mind of science as a result of the constructive work of the great naturalist.

Shall philosophy likewise rule out metaphysics and confine itself to consideration of that type of problem which is open to scientific investigation? The positivist believes that it should.

In his magnificent essay John Dewey gives an excellent statement of The Influence of Darwin on Philosophy, as seen from the positivistic point of view. He speaks of the "intellectual transformation" effected by the Darwinian logic, which is going on in our day, and this transformation he characterizes as follows:

"Interest shifts from the wholesale essence back of special changes to the question of how special changes serve and defeat concrete purposes; shifts from an intelligence that shaped things once for all to the particular intelligences which things are even now shaping; shifts from an ultimate goal of good to the direct increments of justice and happiness that intelligent administration of existent conditions may beget and that present carelessness or stupidity will destroy or forego." 7.

Dewey goes on to say: -

"Were it a thousand times dialectically demonstrated that life as a whole is regulated by a transcendent principle to a final inclusive goal, none the less truth and error, health and disease, good and evil, hope and fear in the concrete, would remain just what and where they now are. To improve our education, to ameliorate our manners, to advance our politics, we must have recourse to specific conditions of generation...

"Finally, the new logic (of Darwin) introduces responsibility into the intellectual life. To idealize and rationalize the universe at large is after all a confession of inability to master the courses of things

that specifically concern us...In having modesty forced upon it, philosophy also acquires responsibility."[7]

The issue of positivism versus metaphysics is one of the most burning issues in modern philosophy. Dewey is entirely right in saying that Darwin's career furnishes a splendid example of the fruitfulness of the scientific method. But metaphysics is very deeply interested in evolution.

Science confines itself to the study of coexistence and sequence of events. The scientific solution of a problem consists in referring phenomena to their secondary causes; to do more than this is not required; the problem of first cause is not touched upon. Metaphysics demands more; it takes up the problem where science leaves off; it demands something more than a mechanical or fortuitous interpretation of events; it wants to know what is first enveloped in any organism which is later to develop. Natural Selection is not, as Darwin himself recognized, a metaphysical explanation of evolution.

Two outstanding metaphysical treatments of evolution are those given by Bergson in his Creative Evolution and Morgan in his Emergent Evolution.

The essence of Bergson's metaphysics is as follows: -- If the individual will thoughtfully consider the flow of experience through which he passes from instant to instant he will find that something is being constantly added to his experience, and this addition means that the individual is always changing; that "being is becoming." A good example of this addition is furnished by the fact that we remember many elements of our past experience; to the experience through which we are now passing, there has therefore been added our memory of past experiences.

Over against this process of change, however, Bergson finds a certain continuous identity beyond change. This continuity is not temporal

or spatial; rather it is a continuity of extension. Its nature is that of a will to live (Elan Vital) and it is transmitted from one generation to the next; it is this Elan which gives rise to new variations within species.

Lloyd Morgan takes issue with the metaphysics of Bergson. He diagramatically represents his own metaphysical scheme by a pyramid at whose base are to be found atoms and at whose apex is mind. Into this pyramid no alien substance or force of the nature of Elan is to be introduced. The emergence of the higher units is to be explained on the ground that God is actively present in all units, whether they be high or low, which are contained in the pyramid.

We have said that metaphysics is interested in what lies behind evolution and to a consideration of this question we shall now turn.

What is the relation of mind to evolution? We shall enquire into the question first from the point of view of physical science, then from the metaphysical point of view.

Two theories concerning the place of mind in evolution have been suggested.

1. The first view is that mind is a product of evolution, a thing created by the process.

2. The second view is that mind is the creative agent, the driving force behind all evolution.

The first of these views is that held by Huxley, Dewey and (with reservations) by Darwin himself.

In his Descent of Man Darwin maintains that the only difference in mentality between man and brutes is one, not of kind, but of degree. Man resembles the lower animals in his instincts of self-preservation, mother-love,

and sexual-love, and individuals of the human species differ in courage and timidity as truly and as widely as do individuals among the lower animals. Man's urge toward self-improvement and social improvement Darwin believed to be merely a product of his higher intelligence, an intelligence which, as has been said, is higher only in degree and not in kind. Huxley said "there is every reason to believe that consciousness is a function of nervous matter, when that nervous matter has attained a certain degree of organization. all that I have to say is, that, in my belief, consciousness and molecular action are capable of being expressed by one another, just as heat and mechanical action are capable of being expressed in terms of one another."[8]

The second possible view we have said is that of looking upon mind as something more than a product of evolution. It is interesting to note that Alfred Russel Wallace, who shares honor with Darwin in the conception of the principle of Natural Selection, looked upon the faculty of making such abstractions as space and time as something beyond the power of Natural Selection to create, and took issue with his friend Huxley upon the latter's contention that thought, sensation and consciousness can be explained in terms of molecular activity.

Do we have any reason for believing that mind is a creative agent? Yes; the mind of genius can create a work of art which is something vastly more than the sum of the elements used. This fact suggests the psychological doctrine of creative or psychical resultants expounded by Wundt. "The law of psychical resultants finds its expression in the fact that every psychical compound shows attributes which may indeed be understood from the attributes of its elements after these elements have once been presented, but which are by no means to be looked upon as the mere sum of the attributes of these elements."[4]

Mind, then, has the ability to create that which is totally new. But are we to look upon mind as the creative force behind evolution?

One of the most important of the recent contributions bearing upon the problem in question is L. T. Hobhouse' Mind in Evolution. We shall follow him in his discussion.

What do we mean by Mind? It is a hard question to answer. We know, however, that the living being is more-than-mechanical in its reactions to things, that it is assertive rather than passive and that, to a certain extent, proportioned to its development, it is self-determining; and we use the term Mind as a name for all this active nature. But if we wish to understand the nature and function of mind we must consider the various facts which have a place in the total concept of mind.

Lowest in the scale of these factors is that process of adaptability by which the organism reacts and readjusts itself to internal and external stimuli; and on the same level is that rhythmical internal activity which keeps the organism in repair by the more-than-mechanical processes of regeneration.

On a higher level is reflex action; this action arises from a preformed structure, but is nevertheless adaptable to the conditions of the organism as a whole.

Conation occupies the next higher level; this may be defined as activity directed toward a change of conditions; and on the level above this is instinct. If we pause at this point we find that while all the factors thus far named have a part to play in our mental processes, no one of them is a true element of intelligence, for they are all <u>mere products of past evolution</u>.

Above instinct, however, are assimilation and readjustment, and we are now entering the realm of true intelligence for these factors make

possible the correlation of those experiences and actions which occur within the life-time of an individual.

On a higher level is practical judgment consisting in the synthesizing of distinct perceptual elements.

Above this is the Concept which makes possible that highest form of active intelligence, namely conceptual thinking. The human adult differs alike from the human infant and from the lower animals in his ability to detach ideas from perception and to recombine them, thus building up a world of ideas and a store of universal judgments. Self-consciousness, creative imagination, religion, morality, and such systems of thought as science and philosophy are products of conceptual thinking.

Such are the elements of mind, arranged in ascending order. In its lower stages mind is organic, but in its higher stages mind is the working out of purpose. For in the absence of mind there is no plan in evolution, and all life is chaos. The only progressive evolution is the evolution of mind, and with the emergence of mind chaos becomes cosmos, and activity becomes swift and sure. It is mind which makes possible those activities which are directed from the past and present toward the future. Do not these considerations indicate that mind is the driving force behind all evolution?

Darwin has said that human intelligence is superior to animal intelligence only in degree. There is no reason why we should not accept this view, providing that we are willing to grant that judgment and conceptual thinking are superior only in degree, not in kind, to the mental activities of lower animals.

We may then grant that the lower animals have minds; that they are more than the "unconscious automata" which Descartes believed them to be.

But still the great problem of emergence of mind is unsolved. Natural Selection certainly offers no explanation here, for it is impotent to create anything; it can merely eliminate or preserve that which has already been created. We are at a loss to explain the emergence of mind unless we place intelligence at the heart of the universe. The problem therefore becomes metaphysical.

What, finally, shall be said concerning the bearing of Darwinism upon the issue of positivism versus metaphysics?

The positivist is entirely right when he says that the career and work of Darwin have furnished a splendid example of the possibilities for scientific advance which inhere in the factual method of research.

But if the example of Darwin has brought about a swing toward the scientific method, the content of Darwinism has brought about an opposite swing toward metaphysics. Two facts confront us; on the one hand we have the thoroughly established truth of evolution, and on the other hand the fact that Natural Selection fails to explain the emergence of intelligence. The problem of how intelligence is possible can be solved only by considering what lies behind and beyond the realm of physics, and a satisfactory explanation of evolution can be secured only by addressing ourselves to the metaphysical problem of efficient cause.

Darwin's Influence on Historical Study.

We shall now turn to a consideration of the influence of Darwin upon modern historical method and interpretation. Darwin's contribution in this field is two-fold. In the first place it was he who established the science of origins, a science which has been carried over into the study of religion, ethics and society. In the second place Darwin has given us a new theory of Utilitarianism. In the period just previous to the publication of The Origin of Species a hedonistic Utilitarianism had been taught in England by Bentham and Mill; the greatest good for the greatest number was believed to be the end and aim of all human activity. The theory of Natural Selection is based upon a different principle of Utilitarianism but upon Utilitarianism nevertheless: survival value, rather than happiness is supposed to be criterion of true usefulness.

The Science of Origins.

Effort is being made in many fields of modern study to trace facts to their historical origins. Examples are numerous.

In his Mind in the Making Robinson traces man's fighting nature to his early animal-like nature, his proneness to speculation to a Grecian origin and his interests in government to a Roman origin.

Sociology traces even such seemingly trivial facts as the whims, notions and jokes of modern society to their historical origins. Our jokes about mothers-in-law are found to be relics of the days when women were the masters rather than the mistresses of the household, and therefore regarded with respect, and even fear, by wooing males. The celibacy of the Catholic priesthood is traced back to belief in the

uncleanliness of woman. The American ideal of temperance traces back to a Quaker rather than, as is often supposed, to a Puritan origin. Thus the past is made to throw light on the present.

Such higher aspects of human experience as religion and philosophy have been subjected to similar historical treatment.

Dewey in his chapter on "Changing Conceptions of Philosophy" in his Reconstruction in Philosophy gives a genetic account of the origin of philosophy. The early beliefs of the race, he says, were not scientific attempts at solutions of problems. Rather, the original material out of which philosophy was later to emerge were symbolic, figurative and imaginative nature. Two preliminary steps, however, were necessary before these semi-mythological materials should be transformed into philosophy. A framework of imagination and memory first took shape; the memories of the race were systematized and consolidated into a body of tradition. But something more than this consolidation was needed before philosophy could emerge. The exigencies of everyday experience drew man's attention to such concrete matters as the facts that fire burns, food appeases hunger, night follows day. As factual knowledge increased it came into conflict with the spirit and temper of those beliefs which had been handed down by tradition; an example of this conflict is found in the Sophistic movement which aimed at the overthrow of the matter-of-fact method. Metaphysics, then, is of non-scientific origin, while science itself is to be thought of as having grown out from man's thought concerning the concrete facts of everyday experience.

In his Origin and Evolution of Religion Hopkins gives a statement of the several theories concerning the origins of religion. It

should be noted that by inquiring into these origins we are not dealing with the problem of the reality and truth of religion; our aim is merely to ascertain the nature of religious impulses and of the forces which have influenced man's religious beliefs.

The first theory mentioned by Hopkins is that of Tylor and Spencer called Animism. Savage man believed that what is active is alive and hence possessed of the same sort of spirit which man possesses. The world is therefore believed to be peopled with spirited objects. Seeing in his dreams the form of a dead man apparently active, the savage infers that human spirits live after death, and thus arises belief in immortality. A second theory is that of Max Muller known as Naturalism. The savage is believed to have feared, and consequently to have revered natural phenomena. A third theory is called the Theory of Magic. Finding that he cannot control the forces of nature, man resorts to entreaty and thus religion emerges.

What benefit is to be derived from this inquiry into origins? The answer we give depends upon our conception of history.

If we accept history for history's sake, if we believe that the story of the life of the race is worth preserving and knowing something about, then our answer must simply be that inquiry into origins increases our understanding of <u>history as history</u>. If history for its own sake is worth studying at all, it is worth studying as thoroughly as possible; to know the origins of facts will clarify our historical insight, increase our historical knowledge, and deepen our historical appreciation.

The sociologist, however, believes that <u>history as history</u> is worthless, that the only valuable facts we can learn from history are social

principles. Those who believe thus look upon the science of origins as a science of considerable value and usefulness. Freud has taught that morbid complexes in adult life frequently result from forgotten experiences in childhood; the psychoanalytic cure consists in bringing the forgotten experience into the full light of consciousness in order to bring about the discharge of emotion, and the formation of new associations. Similarly to bring forth into the light of consciousness the forgotten origins of our social customs and practices may result in the formation of more rational, or at least, more wholesome associations.

Natural Selection in History.

If we wish to apply the theory of Natural Selection in the field of historical interpretation, we must search among the facts of history to find those variations which have favored certain races and institutions over other races and institutions. We must interpret history in terms of survival values.

Consider the variations which favored primitive man in the struggle for existence. An erect posture gave him a tremendous superiority in brain capacity; his perfect hand, the only hand capable of touching thumb to little finger, enabled him to dig pitfalls for his enemies, to throw stones in self-defence, and to shape tools for his purposes.

But of vastly greater importance in the struggle for survival was the greater cunning and superior intelligence of the human race. Speech developed and internal unity characterized the race. Then, too, man was more than gregarious; he had a positive social sense. He arranged an apportionment of labor, and gave care to the sick. Altruism, the willingness

to fight for the life of another developed, and thus through his superior intelligence and better social organization man gained ascendency over the lower animals. The primary struggle, that is, the struggle of man with other species, was won.

But now came a secondary struggle, the struggle for supremacy among different groups, brought on by competition for food and territory. In this struggle, all other factors being equal, the groups characterized by the best organization and leadership enjoyed a great advantage over the other groups. As a result of inter-group warfare classes emerged, the smaller and weaker units were incorporated into the larger and stronger units, and higher and more complex forms of social organization took shape.

The most distinctive feature of human society is the family. This, too, has been interpreted as a product of Natural Selection.

What are the survival values of the family? In the first place, the family is based on sexual reproduction, as over against asexual reproduction; this fact means that a vast range of variations, from which Natural Selection may choose is possible, for an individual inherits the characteristics, not only of his parents, but also of his grandparents. Furthermore, man has no clearly drawn mating season; the number of human offspring is very small; the period of dependence of child upon parent is very long; man has an antipathy for inbreeding which is not found among other animals; the sanction of society is generally sought before a new family is established; man has a sense of shame and modesty concerning sexual matters; and female chastity, even among the lower tribes, is always insisted upon.

But it is apparent that these facts are characteristic of the family <u>as we now know it</u>. Is Natural Selection adequate to explain the

rise of these peculiarities of family life? Natural Selection selects and preserves that which is useful to a species. If monogamy is useful to a race, it is reasonable to suppose that Natural Selection has been instrumental in preserving it. Monogamy may be monotony; nevertheless it is biologically and socially better than the practice of promiscuous mating. Promiscuity on the part of the female cuts down the ability to breed superior children, indeed to breed at all; hence monogamy has a tremendous survival value. Man's tendency to adornment during courtship, his sense of modesty concerning sexual matters, and the fact that married persons are sometimes bound together with ties of spiritual love may be explained on the grounds that man's intelligence and self-consciousness have passed through many stages of progressive evolution, and thus attained a final stage much higher than can be found among lower animals.

Exponents of Natural Selection would also explain the rise of moral institutions in terms of their theory. Fear is thought to be the survival value which has made possible the emergence and preservation of such institutions. Fear may often be a disvalue in the development of species. But in the development of institutions humanity's fear of the power of those institutions becomes a positive survivial value, not necessarily for humanity, but certainly for the institution. It is the institution, rather than mankind, that fear favors.

Darwin's Influence on Ethics.

We have discussed Darwin's influence on historical study. We now turn to a consideration of his influence in the field of ethics. We shall, in this connection, mention two lines of consequence which have followed from the publication of his theory.

His first contribution resides in his having introduced a method of study which has been carried over into the field of ethics, and has resulted in making ethical study more truly scientific in character than it had previously been; we refer to "the science of origins."

Is ethics a ~~study~~ science; and if it be, in which of the categories of science should it be classified? It is clearly not a mathematical science, for ethical propositions are not open to mathematical proof. Nor is it to be classified with the physical sciences which are based on inexorable laws, for goodness is not a constitutive form of sensuous experience. Ethics differs from these other departments of study in that its chief task if to furnish principles for the guidance of conduct. If ethics is to be recognized as a science it must be placed among the historical sciences. History is certainly a true science when it takes upon itself the task of tracing the effects which social, religious and economic forces have had in the life and development of the race; and any subdivision of history which limits itself to a consideration of one aspect of human experience, such as, for example, the social, the religious, or the ethical aspect, must be recognized as a science.

To trace morality from the remotest ages of the past to the present time is the task which a scientific ethics should take upon itself.

It was Darwin, in his Descent of Man, who emphasized this truth. He pointed out that man is superior to the brutes in having the power to think about his past conduct in order to decide what his present and future conduct should be.

When an individual or the race is engaged in this kind of thinking the scientific method is being employed in the study of ethics, for this kind of thinking necessarily requires that we observe, classify and analyze the concrete facts of experience.

If I committed an unjust act yesterday and suffered unhappy ~~results~~ consequences as a result, then I must recognize the indident as a definite fact in my experience; by studying the matter dispassionately I may decide to adopt different methods in the future, and by making this decision I have made an ethical advance.

The race may,and should, in similar manner "learn from experience." It is true that the historical approach to the study of race ethics is more difficult than the approach to the study of individual ethics. The individual can remember a large part of his own experience, while the race has only the relatively meagre records of history as a source of information regarding what has gone on in the past. But the task imposed by evolutionary ethics is worthy of all the effort which we may put into it. If we are to make progress in race-ethics it is imperative that we should give ourselves to the task of tracing our ethical ideas back to their historical origins in order that we may evaluate those ideas and decide what our future conduct should be.

It was Darwin in his Descent of Man who emphasized this truth.

Darwin's second contribution bearing on ethics resides in his having introduced a new principle of Utilitarianism to take the place of the hedonistic Utilitarianism of Bentham and Mill. According to Darwinian Utilitarianism survival value is the criterion of true usefulness; that which is capable of enduring is the highest value.

The process of evolution has gone on with no regard for human standards of right and wrong. Natural Selection is ethically indifferent in its choices.

"It may be difficult," says Darwin," but we ought to admire the savage hatred of the queen-bee, which urges her to destroy the young queens, her daughters, as soon as they are born or to perish herself in the combat; for undoubtedly this is for the good of the community; and maternal love or maternal hatred, though the latter fortunately is most rare, is all the same to the inexorable principle of natural selection."[10.]

Now it is one thing for us to admire the instinctive hatred of the queen-bee, and it is another and quite different thing for us to interpret ethical history and to evaluate our ethical ideals entirely in terms of Natural Selection and Survival values. Yet the latter thing has been done by a number of thinkers, the most notable of whom is Nietzsche.

According to this philosopher, our present civilization is bad because it tolerates sloth and mediocrity. Christianity is wrong

because it teaches pity. God is dead. Truth itself is only relative; any so-called truth is in reality only true because of, and in proportion to, its survival value. Man has emerged from a lower form; it is his highest duty so to strengthen and improve himself that a race of Supermen may arise from his seed. But in order to create, we must first destroy.

Thus does Nietzsche hurl his challenge;

"I teach you Superman. Man is something that is to be surpassed. What have you done to surpass him?

"All beings hitherto have created something beyond themselves; and ye want to be the ebb of that great tide, and would rather go back to the beast than surpass man?"....

"What is the ape to man? A laughing-stock, a thing of shame. And just the same shall man be to the Superman: a laughing-stock, a thing of shame!"....

"It is not your sin--it is your self-satisfaction that crieth unto heaven; your very sparingness in sin crieth unto heaven.

"Where is the lightening to lick you with its tongue? Where is the frenzy with which ye should be inoculated?

"Lo, I teach you the Superman; he is that lightning, he is that frenzy." 7/6

Criticism of Evolutionary Ethics.

Is the evolutionary theory of ethics with its principle of survival values to be accepted as the final theory of ethics? There is undoubtedly much truth in the theory. Probably no thoughtful person would refuse to grant that our ethical backgrounds have changed, and that our ideas about right and wrong have passed through, and are even now passing through, a process of evolution. No reader of Nietzsche could fail to be challenged to better things. But there are certain criticisms of evolutionary ethics which must be taken into account.

We have said that the evolutionists' approach to the study of ethics is the most truly scientific approach possible. But while the study of the history of ethics is a science, the study of ethics as ethics belongs to philosophy rather than to the physical sciences. If we are to make ethical advance we must have full and accurate knowledge of what has gone on in the past; but something more than this is also required. Bearing in mind the story of the past we must think about what ought to be in the future. Ethical thought about what is is impossible unless we also think about what ought to be.

The concept of ought is the very foundation of ethics. The greatest part of the ethical thinking of the race throughout history has consisted, not in speculation, but rather in the application of the concept of ought to specific problems of conduct.

Natural Selection offers no adequate explanation of the existence of a strong sense of duty and of the concept of ought in the human mind. Once again we must remind ourselves that Natural Selection can create nothing; it can merely choose from among things which already exist. Natural Selection may explain the survival of certain particular ethical ideas and the rejection by the race of other particular ideas; but it is impotent to account for the emergence of the ought of ethics. For our solution of this problem we must go into metaphysics.

Two theories regarding the idea of ought have been suggested. The first is that all human intelligence is accidental and fortuitous, that ethical thought is an "epiphenomenon," that is, a chance product of evolution. But is not this theory too naive to be at all satisfactory? Can we be content with any metaphysical theory which simply ignores the problem of First Cause?

The other theory is that finite intelligence is possible only because of infinite intelligence, that human morality is possible only because morality exists throughout the universe. There is, therefore, a certain kind of knowledge which is certain, certain by reason of the very nature of the universe. Morality on the part of finite beings is not a matter of whim or idle choice; it is "categorically imperative." Such is the philosophy of Kant. If Kant is right, the evolutionary theory of ethics with its principle of survival values, cannot be accepted as the final interpretation of

ethical history.

A further criticism lies in the fact that evolutionary ethics overlooks intrinsic values. Utilitarianism, whether hedonistic or biological, recognizes only those values which are means to an end, and leaves out of consideration those values which are good in themselves. If we should, as some evolutionists recommend, set up the ideal of Superhygiene as the supreme end and aim of all human evolution, would we not, by so doing, fall short of the supreme values which are open to personal experience? Are not such values as justice, truth and beauty unchanging and eternal; and are not these values something more than products of evolution?

Conclusion.

We have outlined Darwin's theory and have suggested grounds for dissatisfaction with that theory as the final scientific explanation of evolution.

In a very general sense it is true that Natural Selection presides over the process which gives rise to new forms of life. Modern science, however, finds that the factors in evolution are much more complex than Darwin supposed. We see Natural Selection at work, but we also find mutations in organic development. We recognize, as did Darwin, that an intense struggle for existence is going on, and that those organisms which are best fitted for their environmental conditions are the organisms which will survive. But we also know that society has sometimes proven itself to be stronger than the very Natural Selection which Darwin supposed to be all-powerful; for society, motivated by altruism, has frequently been instrumental in the preservation of those weaker individuals which, without external aid, must certainly have been defeated in the struggle.

The evolution now going in the human race is social as well as biological. Toward what end shall we direct our activities? Shall it not be toward a social state constructed on principles of of understanding and good-will? Would the realization of such a state be more ~~xxxdx~~ wonderful than is the known fact of man's emergence from a lowly origin? If society can control Natural Selection, may society ~~xxx~~ not hope actually to achieve the highest ideals of state of which its seers have dreamed?

We have shown ~~that~~ how the contributions made by Darwin, namely, the fact of evolution, the theory of Natural Selection, and the science of origins, together with the scientific method which his career so splendidly exemplifies, have been carried over into the studies of philosophy, history, and ethics.

We have endeavored to show that the principle of Natural Selection with its survival values is inadequate as a causal ~~explanation~~ explanation of evolution; we have raised the question whether our final explanation of evolution must not be metaphysical?

But by rejecting Natural Selection as the final explanation of what has gone on in the past we do not at all belittle the value or the magnitude of Darwin's contribution to science and to philosophy. Darwin's century was a magnificent age. It has been said that the Renaissance beheld the discovery by man of "a new heaven and a new earth." But the nineteenth century ~~was~~ was characterized by such diligent and searching into the mysteries of heaven and earth as no previous century had beheld; stars were weighed and for the first time in its history science began to learn something of the true antiquity of the earth. But no other single contribution in that period of splendid scientific conquest has aroused such widespread and enduring interest as has the work of Darwin.

His work has aroused a new interest in the story of the past, a new interest in the possibilities of the future, and a new interest in the question of what ultimate reality

lies behind the ordinary facts of human experience.

In his Spirit of Modern Philosophy Royce divides the history of thought into three periods. The first of these was the period of naturalism when man's thoughts centered around matters of patriotism and loyalty. The second was the period of humanism when men thought about the inner workings of the soul, the period of Berkeley, Hume and Kant. The third is the period which is still going on, the period characterized by the realization by science and philosophy of the truth of organic evolution. The questions we have before us are these;

> How can man be both natural and spiritual?"How can he have sprung from an animal ancestry, yes, ultimately from dead matter, and yet be the embodiment, the ~~xxxxix~~ organ of the absolute reason? How can he at once be part of the spirit whose live thinking dreams out this whole frame of things, and yet he himself the slave of the very order of nature which this dream creates? How can he, this mere mechanism, this creature of nerves, this mortal thing whose brain secretes thought, be also, as Kant made him, the very source of the laws of nature themselves? How comprehend this paradox?"12

Thus, not merely in the technical content, but even in the very spirit of modern philosophy the influence of Darwin is at work.

Page References.

1. Osborn, From the Greeks to Darwin, p. 7.

2. From article on Lamarck in Encyclopaedia Britannica.

3. Origin of Species, p. 37.

4. Origin of Species, p. 49.

5, Origin of Species, p. 169.

6. Where Evolution and Religion Meet, p. 75.

7. The Influence of Darwin on Philosophy, pp. 15-17.

8. Darwiniana Essays, pp. 161-163.

9. Outlines of Psychology, p. 369.

10. Origin of Species, pp. 174-5.

11. Thus Spake Zarathustra, (volume 15 of) German Classics pp. 275-277.

12. Spirit of Modern Philosophy, p. 36.

Documentation.

For the facts presented in the section on History of Evolution before Darwin, I am indebted to Huxley's Darwiniana, Wallace's Darwinism, and Locy's Biology and Its Makers and Osborn's From the Greeks to Darwin. Huxley's discussion of "Mr. Darwin's Critics" is especially good with reference to the anti-evolutionary effect of Milton and Suarez. Alfred Russel Wallace gives a brief, but very comprehensive, discussion of pre-Darwinain evolution in Chapter One of his Darwinism, entitled, "What are Species and What do We Mean by Their Origin?"

In my story of the voyage of the Beagle and of the phenomena which especially impressed Darwin, and also of the effect upon Darwin of the reading of Malthus, I am indebted to Darwin's "Introduction" to The Origin of Species, as a primary source, and to the chapter on "Science and Travel" in Libby's History of Science, as a secondary source.

On page 11, I have spoken of "the revolutionary character of Darwin's work." In the Descent of Man, Darwin himself says;

> "The homological construction of the whole frame in the members of the same class is intelligible, if we admit their descent from a common progenitor, together with their subsequent adaptation to diversified conditions...No other explanation has ever been given of the marvelous fact that the embryos of a man, dog, seal, bat, reptile, etc., can at first hardly be distinguished from each other. In order to understand the existence of rudimentary organs, we have only to suppose that a former progenitor possessed the parts in question in a perfect state, and that under changed habits of life they became greatly reduced, either from simple disuse or through the natural selection of those individuals which were least encumbered with a superfluous part, aided by the other means previously indicated." (page 24)

The passage quoted above shows not only the revolutionary nature of Darwin's theory but also the scientific importance of the principle of community of descent which I have mentioned on page 15.

On pages 11 and 12, I have set forth the salient features of Darwin's theory of Natural Selection. Concerning these principles, Darwin makes the following remarks;

"...The structure of every organic being is related, in the most essential yet often hidden manner, to that of all the other organic beings, with which it comes into competition for food or residence, or from which it has to escape, or on which it preys." (page 70, Origin of Species.)

"There is no exception to the rule that every organic being naturally increases at so high a rate, that, if not destroyed, the earth would soon be covered by the progeny of a single pair." (page 60)

"It may metaphorically be said that natural selection is daily and hourly scrutinizing, throughout the world, the slightest variations; rejecting those that are bad, preserving and adding up all that are good." (page 77)

On pages 14 and 15, I have outlined Darwin's discussion of "The Difficulties of the Theory." Beginning with the chapter of that title and extending to the conclusion of The Origin of Species, Darwin devotes more than half of the book to the discussion of specific difficulties. Possibly the most important of these chapters is that on "The Imperfections of the Geological Record."

On pages 13-17, I have discussed Darwin's speculations concerning origins. His reasons for believing in a single birthplace for all life is given in his chapter on "Geological Distribution." His views on the probable course of organic evolution are presented in Chapter XI, "On the Geological Succession of Organic Beings."

The facts contained in my brief mention of the lines of evidence for man's descent from a lower form are obtained from Chapter One of The Descent of Man. The facts with which Darwin therein deals are; homologous structures in man and the lower animals, miscellaneous points of correspondence, embryonic development and rudimentary structures.

Pages 19-22 give a statement of Darwin's contributions to modern thought and science; Natural Selection, evolution, the "Science of Origins," and Darwin's personal example. I have borrowed the term "science of origins" from John Dewey.

In my section on Darwin's Influence with Reference to the Issue of Positivism versus Metaphysics, I have the two-fold purpose of (1) giving a fair statement of the positivistic side, and (2) of defending the metaphysical side.

Darwin saw that Natural Selection was not a metaphysical explanation of evolution. On pages 74 and 75 of The Origin of Species, he says;

> "Several writers have misapprehended or objected to the term Natural Selection. Some have even imagined that natural selection induces variability, whereas it implies only the preservation of such variations as arise and are beneficial to the being under its conditions of life. No one objects to agriculturists speaking of the potent effects of man's selection; and in this case the individual differences given by nature, which man for some object selects, must of necessity first occur. Others have objected that the term selection implies conscious choice in the animals which become modified; and it has even been urged that, as plants have no volition, natural selection is not applicable to them! In the litural sense of the word, no doubt, natural selection is a false term; but who ever objected to chemists speaking of the elective affinities of the various elements?"

In his Ethical Import of Darwinism, Schurman, arguing for a metaphysical philosophy of evolution, says:

> 'To science, certainly, as the register of nature's operations, the whole subject of natural slection naturally belongs. But when the designation for a purely natural process has through the suggestions of metaphor and the use of capital letters come to stand for something more than a process, and, from constant association with an extraneous metaphysics, has acquired the potence of a conjurer's formula in the philosophy of life, mind, and conscience, it is high time to set about the perennial problem of laying the dust raised by dogmatic metaphysicians, who are all the more insidious when they disown their vocation and come to us in the name of positive science with the prestige that science gives.' (page 63)

On page 26, I have mentioned Wallace's views as over against the views of Huxley on the emergence of mind. On pages 181-183 of his Darwinism, Huxley gives a fair statement of the views of Wallace, and it is to him that I am indebted for my facts concerning the views both of Wallace and of himself.

The views of Darwin on the evolution of mind are set forth in Chapter III of his Descent of Man, entitled, 'Comparison of the Mental Powers of Man and the Lower Animals."

On page 30, I have said that Darwin's first contribution to history resides in his having established the science of origins. On pages 29 and 30 of his Sociology and Modern Social Problems, in his chapter entitled 'The Bearing of the Theory of Evolution upon Social Problems," Ellwood says,

> 'Since Darwin wrote his Origin of Species all the sciences in any way connected with biology have been profoundly influenced by his theory of evolution...It is evident that if we assume Darwin's theory of descent in sociology we must look for the beginnings of many peculiarly human things in the animal world below man. Human institutions, according to this theory could not be supposed to have an independent origin, or human society in any of its forms to be a fact by itself, but rather all human things are connected with the whole world of animal life below man...So long as it was possible to look upon human society as a distinct creation, as something isolated, its by itself in nature, it was possible to look to intellectualistic views of the origin of human institutions.'

Anthropology and Sociology are perhaps the two departments of history which are most deeply interested in the study of origins. Some recent works, dealing with human, social, and cultural origins, are; G. G. MacCurdy's Human Origins; H. H. Newman's Readings in Evolution; W. I. Thomas' Source Book for Social Origins; W. J. Sollas' Ancient Hunters; C. Wissler's Man and Culture.

In connection with the topic of Darwin's influence on history it should be noted that the Darwinian principles of evolution and community of descent constitute the very basis upon which anthropology is built. In his anthropology, Marett says;

> 'Anthropology is the child of Darwin. Darwinism makes it possible. Reject the Darwinian point of view, and you must reject anthropology also...Man must, for certain purposes of science, toe the line with the rest of living things. And at first he did not like it...Now-a-days, however, we have mostly got over the first shock to our family pride. We are all Darwinians in a passive kind of way. But we need to darwinize actively...None of Darwin's particular doctrines will necessarily endure the test of time and trial. Into the melting-pot must they go as often as any man of science deems it fitting. But Darwinism as the touch of nature that makes the whole world kin can hardly pass away. At any rate anthropology stands or falls with the working hypothesis, derived from Darwinism, of a fundamental kinship and continuity amid distance between all forms of human life." (pages 8-11)

For the interpretation in terms of survival values which I have given on pages 33-35 of (a) man's ascendency over lower animals and (2) the rise of the moral teachings of the race, I am indebted to Schurman's Ethical Import of Darwinism. For my facts concerning the evolutionary theory of the rise of the family I am indebted to Ellwood's Chapter on "The Origin of the Family."

On pages 36-39, I have discussed Darwin's influence on Ethics. For my facts bearing on this topic, I am indebted to Darwin, Dudley and Schurman (the latter of whom is fair to evolutionary ethics although he rejects it in favor of Kant.)

Darwin's theory is utilitarian, although not identical with the Utilitarianism of Mill. The latter philosopher writes;

> "The creed which accepts as the foundation of morals, Utility, or the Greatest Happiness Principle, holds that actions are right in proportion as they tend to promote happiness, wrong as they intend to produce the reverse of happiness."

(Utilitarianism, Page 6.)

Darwin's is a biological Utilitarianism. He writes;

'I fully admit that many structures are now of no direct use to their possessors, and may never have been of any use to their progenitors...But (with certain important exceptions) the(entire) structure of every living creature either now is, or was formerly, of some direct or indirect use to its possessor.'
(page 190, Origin of Species.)

'It may be difficult, but we ought to admire the savage instinctive hatred of the queen-bee, which urges her to destroy the young queens, her daughters, as soon as they are born, or to perish herself in the combat; or undoubtedly this is for the good of the community.' (page 194, Origin of Species.

In my criticism of Evolutionary Ethics I have made mention of Kant's philosophy of ethics as opposed to Darwinian ethics. In his Metaphysic of Ethics, Kant writes;

'...There is an imperative which commands a certain conduct immediately, without having as its condition any other purpose to be attained by it. This imperative is Categorical. It concerns not the matter of the action, or its intended result, but its form and the principle of which it is itself a result.'
(page 39.)

'Since the universality of the law according to which effects are produced constitutes what is properly called nature in most general sense (as to form), that is, the existence of things so far as it is determined by general laws, the imperative of duty may be expressed thus: Act as if the maxim of ~~xxxx~~ thy action were to become by thy will a universal law of nature.' (page 46. Fundamental Principles of the Metaphysics of Ethics.)

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The books from which I have received the greatest amount of help are starred twice. Those from which I have received a certain, but smaller, amount of help are starred once. Non-starred books are books which I have studied, but have not, to any great extent, used in preparing this thesis.

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